

ABSTRACT OF THE DISCLOSURE

A silicon-backed microdisplay with reduced flicker and a protected glass-side conductive layer. The silicon-backed microdisplay includes a silicon die, a silicon-side conductive layer disposed on the silicon die, and a silicon-side passivation layer arranged on the silicon-side conductive layer. The silicon-backed microdisplay also includes a cover glass, a glass-side conductive layer disposed on the cover glass and a glass-side passivation layer of a predetermined material and thickness arranged on the glass-side conductive layer. Liquid crystal material is sandwiched between the glass-side passivation layer and the silicon-side passivation layer in the silicon-backed microdisplay. Visible flicker is suppressed in the microdisplay by selecting a glass-side passivation layer material (for example, CeO_2 , In_2O_3 , MgO , SnO_2 , Ta_2O_5 , TiO_2 , Y_2O_3 , ZnO , SiO_2 , Al_2O_3 , BeO or MgF_2) and thickness (for example, in the range of 300 angstroms to 900 angstroms) that improve the work function balance between (i) a combination of the glass-side conductive layer and the glass-side passivation layer and (ii) a combination of the silicon-side passivation layer and the silicon-side conductive layer. The presence of a glass-side passivation layer will also help maintain the work function balance by protecting the glass-side conductive layer surface from exposure to impurities.